

PATENT APPLICATION BASED ON:

Docket No:	83,241
Inventors:	Leslie Polgar Ronald Cok Edward Woodrow Kevin Yager
Attorney:	Thomas H. Close

DISAGGREGATED FLAT PANEL DISPLAY

Commissioner for Patents
Attn: Box Patent Application
Washington, DC 20231

Express Mail Label No: *EL 486846842US*
Date: *November 1, 2001*

DISAGGREGATED FLAT PANEL DISPLAY

FIELD OF THE INVENTION

The present invention relates to flat panel displays and more
5 particularly to disaggregated organic light emitting diode displays.

BACKGROUND OF THE INVENTION

Portable electronic devices such as cell phones, pagers, PDAs,
global position systems, and electronic cameras having flat-panel displays are
10 becoming more and more common. The quality of the displays on many of these
devices is less than pleasing and barely adequate for the purposes. Small-scale
(e.g. 10 by 16 cm) high-quality flat-panel color displays using organic light
emitting diodes are able to provide high-quality images that are visible in ambient
illumination conditions and use less power than previous display technology.
15 These OLED displays have been proposed for use with a variety of portable
electronic devices to improve the quality of the display. However, there is a cost
associated with providing a high quality display for each of these devices.

Many computer systems include separable components, that is
components that can be unplugged from each other and, in some cases, plugged
20 into other systems. Examples include floppy disk drives, keyboards, and CRT
displays. Some of these devices utilize a common electrical interface, for example
a serial or parallel port available with most computers. However, these devices
are generally intended for use with a single system and are not readily applied to a
wide variety of computing devices. In particular, although a CRT display device
25 is a part of many computer systems, it is not portable and requires some set up to
properly interface with a given system.

Laptop computers also include a variety of components, some of
which can be readily removed or replaced, particularly within special docking
cradles intended to hold the component. For example, battery packs, Digital
30 Versatile Disk drives, and Compact Disk drives are all removable components
available with the IBM Thinkpad laptop computer. However, these components

are not intended for use with a multiplicity of different kinds of devices but are restricted in their application to a specific computer.

Memory devices such as CompactFlashTM memory are presently used with multiple devices such as digital cameras, PDAs and personal computers.

5 There are also portable electronic devices that include external peripherals. For example, folding keyboards can be purchased as component peripherals for PDAs. Likewise, special cameras such as the PalmPix from Eastman Kodak can be connected to the Palm PDA. In these cases, however, the components are not compatible with other kinds of electronic devices or even with other PDA from
10 other manufacturers.

There is a need therefore for an improved display that is compatible with a wide variety of portable electronic devices and avoids the expense of redundant displays for each device.

15 SUMMARY OF THE INVENTION

The need is met according to the present invention by providing a disaggregated flat panel color display, including a frame; an OLED display screen mounted in the frame; and an electrical/mechanical interface on the frame for releasably attaching the frame to any one of a plurality of different electronic
20 devices. As used herein, a disaggregated display means a display that is detachable from and can be used on a variety of different electronic devices.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a plan view of a disaggregated display according to the
25 present invention;

Fig. 2 is top view of a disaggregated display according to the present invention;

Fig. 3 is a schematic diagram showing a system including a plurality of electronic devices and a disaggregated display according to the present
30 invention;

Fig. 4 is a perspective view of a disaggregated display used in a digital camera;

Fig. 5 is a schematic block diagram of a disaggregated display according to an alternative embodiment of the present invention;

5 Fig. 6 is a perspective view of a disaggregated display used in a palm sized computer;

Fig. 7 is a perspective view of a disaggregated display used in a personal digital assistant; and

10 Fig. 8 is a perspective view of a disaggregated display used in a cell phone.

DETAILED DESCRIPTION OF THE INVENTION

Referring to Figs. 1 and 2, the disaggregated display 10 according to the present invention includes a frame 12. A color OLED display screen 14 is mounted in the frame. The frame 12 includes an electrical/mechanical interface 16. The electrical/mechanical interface includes a plurality of electrical conductors 18 that are electrically connected to the display for providing power and drive signals to the OLED display screen 14. The electrical mechanical interface also includes a socket 20 for releasably attaching the frame to any one of a plurality of different electronic devices (not shown). The socket 20 is adapted to receive a complementary plug in an electronic device. The size of the OLED display screen is preferably about 10 by 16 cm, with at least quarter VGA resolution (240x320 pixels) but the actual size and resolution are not critical factors.

25 Referring to Fig. 3, a system employing the display according to the present invention is shown. The system includes the disaggregated display 10, and a plurality of different electronic devices. For example, the electronic devices may include, but are not limited to a PDA 24, an electronic camera 26, a cellular telephone 28 and a palm-sized computer 29. Each of the electronic devices 24, 26, 28 and 29 includes an electrical/mechanical interface that is complementary to the electrical mechanical interface socket 16 of the display 10. The electrical,

30

mechanical interface includes, for a example, slot 30 for receiving and mechanically supporting the edges of frame 12 of the disaggregated display 10 and a plug 31 for plugging into socket 20 to make an electrical connection to the electrical components including the OLED display screen 14.

5 Referring to Fig. 4, an electronic camera 26 for use with the disaggregated display 10, the camera 26 includes a body 34 defining a slot 30 for receiving the disaggregated display 10. The camera includes a taking lens 36, a viewfinder 38, and a shutter release button 40. The camera 26 can also include a user interface 42 including a plurality of buttons that are covered when the display
10 is attached to the camera and can be accessed by a user of the camera when the display is not attached.

 Referring to Fig. 5, in an alternative embodiment of the display 10, the display includes a touch screen 44, a power supply 46, a memory 48 to store data such as image data, and sufficient control electronics 50 such that the display
15 can be used to display captured images when the display is not connected to the camera 10. The display can then be transported, viewed by others, and passed around to a group of people for viewing independently of the original electronic device. For example, the electronic camera 26 might be used by a photographer to capture a scene. The scene can then be displayed on the display 10, detached, and
20 given to others to view.

 The display 10 may also include a wireless communication transceiver 52 so that the display can communicate with an electronic device such as the camera 26 even when it is not connected to the device. For example, through the wireless transceiver 52, the display 10 can be used to remotely control
25 the electronic device by displaying a control menu on the display and receiving control inputs from the touch screen 44. Alternatively, the electronic camera 26 can be operated independently of the display 10 to capture images, and the image data transmitted to and displayed by the display 10. The disaggregated flat-panel color display device 10 may also include software to provide display services for
30 data or images stored in an electronic device such as a camera.

The power supply 46 can be any conventional portable power supply such as an alkaline battery, a rechargeable battery such as a NiCad battery, or a fuel cell. A rechargeable battery may be recharged from a power supply in the electronic device, or alternatively from an external battery charger 54.

5 Referring to Fig. 6, a palm sized computer 29 for use with the disaggregated display 10 the computer 29 includes a cover 60 defining a slot 30 for receiving the disaggregated display 10. The computer includes a keypad 62. As described above, the display device may include a touch screen, an independent power supply and a wireless transceiver. In this embodiment, the
10 palm sized computer 29 can be operated remotely with the display 10, either by operating the display from the keyboard, or by operating the computer from the display 10 using the touch screen as a user interface.

Referring to Fig. 7, a personal digital assistant (PDA) 24 for use with the disaggregated display 10 the PDA 24 includes a body 64 defining a slot
15 30 for receiving the disaggregated display 10. The PDA 24 includes a simple user interface such as buttons 66. As described above the display 10 may include a touch screen, an independent power supply and a wireless transceiver. In this embodiment, the PDA 24 can be operated remotely from the display 10 using the touch screen 44 as a user interface.

20 Referring to Fig. 8, a cell phone 28 for use with the disaggregated display 10 defines a slot 30 for receiving the disaggregated display 10, and a latch 74 for releasably holding the display in the slot 30. The cell phone 28 includes a microphone 70 and a speaker 72. As described above the display 10 may include a touch screen, an independent power supply and a wireless transceiver. In this
25 embodiment, the cell phone 28 can be operated remotely from the display 10 using the touch screen 44 as a user interface. As described above with respect to the digital camera, the cell phone 28 may include user interface buttons (not shown) that are hidden when the display is mounted on the cell phone.

Disaggregated displays according to the present invention can be
30 sold independently of the electronic devices, thereby reducing the cost of the electronic devices by sharing the cost of the display with several devices.

The invention has been described in detail with particular reference to certain preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

PARTS LIST

10	disaggregated display
12	frame
14	OLED display
16	interface
18	electrical conductors
20	socket
24	PDA
26	digital camera
28	cell phone
29	palm-sized computer
30	slot
31	plug
34	camera body
36	taking lens
38	viewfinder
40	shutter release
42	user interface
44	touch screen
46	power supply
48	memory
50	control electronics
52	communications transceiver
54	battery recharger
60	cover
62	keypad
64	body
66	button
70	microphone
72	speaker
74	releasable latch